

What's New in Orthopedics

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IN the enlargement of the field of orthopedic surgery, rapidly encompassing as it has much that was considered in the province of general surgery, the pace of developments has become greatly accelerated. Under "What's New," consideration should be given to recent research investigations, especially those of physiochemical nature, and to the more practical observations along clinico-pathological lines, including changing ideas in teaching orthopedic surgery and the treatment of fractures.

It is evident that penicillin therapy has taken or may take the treatment of acute hematogenous or traumatic osteomyelitis out of the hands of the surgeon and put it into the hands of the internist or pediatrician, and at the same time has completely altered the prognosis. Dosages of 100,000 or more units are being given every two hours in proven or even suspected cases. This may be dangerous propaganda to spread amongst physicians who have never made an intimate study of bone infections, especially those resulting from injury, for the practitioner who is not specially trained may be inclined to handle them without the necessary meticulous debridement, careful hemostasis and traction, with or without splinting, when fracture is present. He who depends solely on the hypodermic injection will get into difficulties.

The author agrees with Lederle⁵ that in open fracture the extension of thrombosis in adjacent blood vessels and the loss of vitality in infected bone with necrosis and separations are accompanied by a walling-off process in the local area which inhibits the access of penicillin-laden serum to the infected bone, thus nullifying the effect of the antibiotic. Judicious surgical treatment at the proper time might reverse this process.

Prolonged use of the antibiotics, started early in the attack of bone infection before destruction (death) of any large areas occurs, may cause the walled-off infected bone finally to become sterilized. Several weeks of administration may lead to aseptic instead of septic necrosis of the bone and avoid the formation of a gross involucrum or massive sequestrum. This bone then, under protection of proper splinting and freedom from intensive trauma, becomes replaced by new bone laid down within the old necrotic bone, thus saving bony contour and hopefully leaving growing areas in the epiphyses active. The use of antibiotics (penicillin) is now accepted in an earlier attempt at bone transplantation in areas previously septic, as after open infected fracture. Three to 8 million units are given over

quite a long period of time and a surgical approach is sought to the nonunion remote from the old infected scar. This may be attempted within a few weeks after closure of the primary infected wound or the healing of defects left by chronic osteomyelitis.

In the field of physiochemistry, orthopedic surgery has been forced to consider the latest advances concerning blood coagulation and thrombosis, which are frequent bugbears after orthopedic operation and necessary long immobilization. Felder³ advises the use of 500 mg. doses of Pitkin's men-strium with a small amount of a vasoconstrictor hypodermically, in divided doses in each thigh, as a practical method of lowering prothrombin time and raising clotting time, thus side-stepping thrombosis and embolism. This holds the clotting time elevated two or three times above normal for 48 hours. Dicumarol, if used, can only be given orally, as it is insoluble except in strong alkaline solution. Its use must be accompanied by careful prothrombin determination, as its action is delayed. The author does not use it preoperatively. On the first postoperative day, 300 mg. is given, 200 mg. on the second day and 100 mg. on the third day, trailing off to 50 mg. doses as the prothrombin determination may indicate in the face of a real thrombosis. In his work Felder found that thrombophlebitis developed in 6.6 per cent of patients operated upon for fracture of the hip. Loewe and Hirsch⁶ believe that the incidence of secondary embolism was reduced from 30 per cent to 2.17 per cent and consider Homan's sign a valuable clinical adjunct.

Daily prothrombin determination in postoperative patients, as advocated in 1948 by Sandrock and Mahoney,¹⁰ because of their value in predicting thrombotic complications, has been reviewed this year by McClure and his associates. Sandrock noted a sudden rise in the prothrombin level on the third postoperative day in several patients who either developed clinical thrombosis subsequently or received prophylactic dicumarol. McClure observed 12 instances of thrombosis in 179 patients, but in only six of these was there a warning from the prothrombin activity. Furthermore, thrombosis did not develop in 64 patients with high prothrombin levels. Results of tests for fibrinogen B (described by Lyons of Australia) were not of prognostic importance.

It is possible that instances of overdosage with anticoagulants and excessive lowering of prothrombin time may be controlled by the use of protamine sulfate in accordance with Allen's experiments on dogs at the University of Chicago. These points may aid in the reduction of postoperative thrombophlebitis and phlebothrombosis, especially in elderly people, and so lower further the mortality rate of

⁵ Presented as part of the Panel Discussion of "What's New" before the General Meeting at the 78th Annual Session of the California Medical Association, Los Angeles, May 8-11, 1949.

prolonged traction or necessary operations on them.¹⁰

Freyberg and Levy⁴ in an analysis of complications in patients with fractures of the hip found that preexisting diabetes, arteriosclerosis or hypertension did not compound the hazards to patients, although these diseases would have complicated any superimposed infection or vascular accident. They found pulmonary infarction in four patients with two deaths out of 29 patients who had complications in ten years. Allbright advises prophylactic use of estrogen or androgen against the osteoporosis in older women if long bed rest is contemplated. In these patients the porosis is not considered to be a disturbance of calcium and phosphorus metabolism, but as due to insufficient production of osteoid tissue.

The role of alkaline phosphates in osteogenesis has also come into prominence.^{7, 8} It seems to be established that the enzyme alkaline phosphatase is concerned more with the formation of fibrocollagenous framework or matrix of the bone than the impregnation of this framework with calcific salts. Consequently, further research into the protein matrix of bone and other factors in the precipitation and fixation of bone salts is suggested to the bright young investigators of the Pacific coast.

In the clinicopathological field, attention must be directed to the reports of H. A. Thomas Fairbank of London entitled "An Atlas of General Affections of the Skeleton" printed in the recent British numbers of the *Journal of Bone and Joint Surgery*. These are well ordered and studied observations of a matured mind worthy of attention for "What's New in Orthopedics" and a stimulus for individual record-keeping through life by any surgeon.

Excision of the patella after various kinds of fractures is still a moot question, answered in part by Scott's¹¹ resume of 196 instances of fracture followed by 101 complete excisions and 33 partial excisions, a much higher percentage than anyone has hitherto reported. This is a very live subject and Scott's report was published only after the editorial board of the journal in which it was printed had subjected it to close scrutiny and severe criticism, and then on the basis that it was a provocative contribution. Undoubtedly there does follow considerable disability after many instances of complete excisions. Radical excision of joint malacia, however, either locally or by patellectomy, has been accepted as orthodox.

Additional new points concern reports on the treatment of poliomyelitis and fractures of the neck of the femur. In Steindler's¹² masterly remarks on the former, it is stated that the disease is not limited to the anterior horn cell although that is where the parenchymatous lesions are found, while elsewhere the lesions are glial or interstitial in character. Some of the lesions in the anterior horn cell also are reversible, unless the cell is destroyed. In that event the condition must be considered final. Therefore the principles learned from basic science laid down by Lovett 40 years ago make us cling to the use of rest and avoidance of stretch reflexes of

the affected muscle or contraction of the antagonist. Along with this, immobilization of the paralyzed muscle is reduced to a minimum and weight bearing is allowed as early as possible. Prolonged recumbency is permitted only when spinal asymmetry threatens. Active movement in the form of a rational and purposeful program of muscle reeducation is advocated.

Fracture of the neck of the femur with sequences of aseptic necrosis of the head, arthritis of the hip and delayed unions is a subject of continuing study.^{1, 13} Delayed weight bearing has finally become an acknowledged necessity if there is the slightest suspicion of aseptic necrosis of the head. Phemister⁹ believes that drilling of the necrotic head with the insertion of transplanted bone pegs may prevent collapse and hasten the replacement of dead bone by new. Many patients thus treated must be studied to determine the final value of this suggestion.¹

Changes in fracture nomenclature are under way. Committees have been appointed by several of the national surgical and orthopedic bodies to consider these first and finally to meet in joint sessions for adoption of more or less standard terms.² At its meeting in Boston, January 1949, the Committee on Fractures and Other Traumas of the American College of Surgeons voted unanimously to drop the meaningless terms "simple" and "compound" fracture and to use henceforth in all records and speech the descriptive terms "open" and "closed" fracture. This initial step in the program is worthy of consideration, as it will be extended to all printed matter.

Finally, new steps are being taken to revise the teaching of the subject of fractures. In the meeting of the committee just referred to Dr. Gallie of Toronto read a formal paper covering a subcommittee report on teaching in this important division of surgery, reviewing older methods, and calling attention to the lack of thorough preparation in anatomy, physiology and pathology as these subjects bear particularly on orthopedic surgery, under present systems of teaching. There has recently been a shift of the responsibility for this teaching from the surgical to the orthopedic faculty subdivisions, with resulting chaotic upset in the methods of instruction. The author discussed Dr. Gallie's paper, stressing the lack of coordination in the teaching of roentgenology and pathology and the overemphasis placed on operative treatment of long bone fractures in order to obtain a nice-appearing roentgenological film with little or no regard for the equally important functional and economic result. It appears now that very little undergraduate teaching on the subject of fractures can properly be given in the crowded medical curriculum, and that little only to senior medical students who may have a small amount of clinical experience and judgment. Soon all teaching on this subject will become graduate in type. If left in orthopedic hands, the teaching during the next 25 years will fall on the shoulders of men now holding residencies or fellowships in orthopedic surgery. And these men may not be fully prepared

to teach the subject, in that they have not lived through the changes in treatment brought out in the last 30 years and may not be well enough grounded in the history of the development of treatment. This may not deter them from advancing, however, if they have enough preparation in pathology, backed by practical experience in the handling of large series of cases. Orthopedic teachers cannot be made overnight nor after a few months' experience in military service. They must have thorough grounding in pathology plus a background of experience which cannot be obtained from books.

Special training of nurses and certification for orthopedic nursing is now practiced in several locations. It should spread everywhere in the United States.

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QUESTIONS AND ANSWERS

DR. SPEED: "Do you think pediatricians could keep poliomyelitis patients out of the orthopedic-health department wards, iron lungs, and short coffins, if they would control the congestive inflammation in the anterior horns and work by early counter-irritation along the nape of the neck and skin of the spine in the early stages?"

My answer would be divided into two parts. The pediatrician must conform to the state law requirements covering the disposition of poliomyelitic cases, in addition to whatever local health measures may be added to the state law by local ordinance.

I cannot see that the application of skin counter-irritation would affect in the slightest way the destructive process in the anterior horn cells, any more than a plaster on the abdominal wall would have any effect on the progressive pathologic changes in an acute attack of appendicitis. Such ideas as this have been dead and buried for 100 years.

